

C L A I M S

1. A method of visualizing a sample in a wet environment comprising:
introducing a sample into a specimen enclosure in a wet environment;
5 and
scanning said sample in said specimen enclosure in a scanning electron microscope, thereby visualizing said sample.
2. A method of visualizing a sample in a wet environment according to
10 claim 1 and also comprising enhancing contrast between plural elements in said sample prior to scanning of said sample.
3. A method of visualizing a sample in a wet environment according to
claim 2 and wherein said enhancing comprises specific labeling of at least some of said
15 plural elements in said sample.
4. A method of visualizing a sample in a wet environment according to
claim 2 and wherein said enhancing comprises specific labeling of molecules in said
sample.
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5. A method of visualizing a sample in a wet environment according to
claim 2 and wherein said enhancing comprises specific labeling of receptors in said
sample.
- 25 6. A method of visualizing a sample in a wet environment according to
claim 2 and wherein said enhancing comprises specific labeling of organelles in said
sample.

7. A method of visualizing a sample in a wet environment according to claim 2 and wherein said enhancing comprises specific labeling of binding sites in said sample.

5 8. A method of visualizing a sample in a wet environment according to claim 2 and wherein said enhancing comprises specific labeling of structural elements in said sample.

9. A method of visualizing a sample in a wet environment according to 10 claim 2 and wherein said enhancing comprises specific labeling of functional elements in said sample.

10. A method of visualizing a sample in a wet environment according to any 15 of claims 1 - 9 and wherein said scanning visualizes elements in said sample having contrast due to differences in atomic numbers of constituent atoms thereof.

11. A method of visualizing a sample in a wet environment according to claim 2 and wherein said enhancing introduces differences in atomic numbers of constituent atoms of elements of said samples.

20 12. A method of visualizing a sample in a wet environment according to any of claims 1 - 11 and wherein said scanning visualizes lipid containing entities in said sample.

25 13. A method of visualizing a sample in a wet environment according to any of claims 1 - 11 and wherein said scanning visualizes nucleic acid containing entities in said sample.

14. A method of visualizing a sample in a wet environment according to any of claims 1 - 11 and wherein said scanning visualizes protein containing entities in said sample.

5 15. A method of visualizing a sample in a wet environment according to any of claims 1 - 11 and wherein said scanning visualizes carbohydrate containing entities in said sample.

10 16. A method of visualizing a sample in a wet environment according to any of claims 1 - 11 and wherein said scanning visualizes metal containing entities in said sample.

15 17. A method of visualizing a sample in a wet environment according to any of claims 1 - 11 and wherein said scanning visualizes iodine containing entities in said sample.

18. A method of visualizing a sample in a wet environment according to any of claims 1 - 17 and wherein said sample is a biological sample.

20 19. A method of visualizing a sample in a wet environment according to claim 18 and wherein said biological sample comprises cells in a liquid.

25 20. A method of visualizing a sample in a wet environment according to claim 19 and wherein said sample comprises lipids within cells and said scanning visualizes said lipids.

21. A method of visualizing a sample in a wet environment according to any of claims 1 - 20 and wherein said scanning visualizes cells in said sample.

22. A method of visualizing a sample in a wet environment according to any of claims 1 - 20 and wherein said scanning visualizes tissue in tissue slices.

5 23. A method of visualizing a sample in a wet environment according to any of claims 1 - 20 and wherein said scanning visualizes tissue.

10 24. A method of visualizing a sample in a wet environment according to any of claims 1 - 23 and wherein said scanning visualizes cells in said sample which are adherent to an electron beam permeable membrane.

15 25. A method of visualizing a sample in a wet environment according to any of claims 1 - 24 wherein said specimen enclosure comprises an electron beam permeable membrane and the method also comprises growing cells on said electron beam permeable membrane prior to said scanning.

20 26. A method of visualizing a sample in a wet environment according to any of claims 1 - 25 wherein said specimen enclosure comprises an electron beam permeable membrane and the method also comprises manipulating cells on said electron beam permeable membrane prior to said scanning.

25 27. A method of visualizing a sample in a wet environment according to any of claims 1 - 26 and wherein said scanning visualizes an outcome of introduction of an extrinsic molecule to said sample.

28. A method of visualizing a sample in a wet environment according to any of claims 1 - 27 and also comprising detecting electromagnetic radiation emitted from said sample as a result of said scanning.

29. A method of visualizing a sample in a wet environment according to claim 28 and also comprising analyzing said electromagnetic radiation.
- 5 30. A method of visualizing a sample in a wet environment according to claim 29 and wherein said analyzing said electromagnetic radiation comprises spectral analysis.
- 10 31. A method of visualizing a sample in a wet environment according to any of claims 1 - 30 and also comprising detecting an electron beam backscattered from said sample as well as electromagnetic radiation emitted from said sample as a result of said scanning.
- 15 32. A method of visualizing a sample in a wet environment according to claim 31 and wherein said electromagnetic radiation comprises X-ray radiation.
- 20 33. A method of visualizing a sample in a wet environment according to either of claims 31 and 32 and wherein said electromagnetic radiation comprises visible radiation.
34. A method of visualizing a sample in a wet environment according to any of claims 31 - 33 and wherein said electromagnetic radiation comprises radiation having a wavelength within the range of 200 - 1000 nm.
- 25 35. A method of visualizing a sample in a wet environment according to any of claims 31 - 34 and wherein said electromagnetic radiation comprises radiation providing information relating to molecular structure of said sample.

36. A method of visualizing a sample in a wet environment according to any of claims 31 - 34 and wherein said electromagnetic radiation comprises radiation providing information relating to material distribution within said sample.

5 37. A method of visualization of a sample in a wet environment according to any of the preceding claims and wherein said scanning comprises scanning said sample in said specimen enclosure in a scanning electron microscope at multiple different electron energy levels.

10 38. A method of visualization of a sample in a wet environment according to claim 37 and also comprising:

reconstructing a three-dimensional image of said sample by using multiple visualizations of said sample at said multiple different electron energy levels.

15 39. A method of visualization of a sample in a wet environment according to any of claims 1 - 38 wherein said sample is a multi-component sample and said scanning comprises scanning said multi-component sample in said specimen enclosure in a scanning electron microscope, thereby visualizing at least one component of said multi-component sample.

20 40. A method of visualization of a sample in a wet environment according to any of claims 1 - 39 and also comprising obtaining said sample to be inspected, said sample being in a wet environment.

25 41. A method of visualization of a sample in a wet environment comprising: introducing a sample into a specimen enclosure in a wet environment; and

scanning said sample in said specimen enclosure in a scanning electron microscope at multiple different electron energy levels.

42. A method of visualization of a sample in a wet environment according to
5 claim 41 and also comprising:

reconstructing a three-dimensional image of said sample by using multiple visualizations of said sample at said multiple different electron energy levels.

43. A method of visualizing a sample in a wet environment according to
10 claim 42 and also comprising enhancing contrast between plural elements in said sample prior to scanning of said sample.

44. A method of visualizing a sample in a wet environment according to
claim 43 and wherein said enhancing comprises specific labeling of at least some of
15 said plural elements in said sample.

45. A method of visualizing a sample in a wet environment according to
claim 43 and wherein said enhancing comprises specific labeling of molecules in said sample.

- 20 46. A method of visualizing a sample in a wet environment according to
claim 43 and wherein said enhancing comprises specific labeling of receptors in said sample.

- 25 47. A method of visualizing a sample in a wet environment according to
claim 43 and wherein said enhancing comprises specific labeling of organelles in said sample.

48. A method of visualizing a sample in a wet environment according to claim 43 and wherein said enhancing comprises specific labeling of binding sites in said sample.
- 5 49. A method of visualizing a sample in a wet environment according to claim 43 and wherein said enhancing comprises specific labeling of structural elements in said sample.
- 10 50. A method of visualizing a sample in a wet environment according to claim 43 and wherein said enhancing comprises specific labeling of functional elements in said sample.
- 15 51. A method of visualizing a sample in a wet environment according to any of claims 41 - 50 and wherein said scanning visualizes elements in said sample having contrast due to differences in atomic numbers of constituent atoms thereof.
52. A method of visualizing a sample in a wet environment according to claim 43 and wherein said enhancement introduces differences in atomic numbers of constituent atoms of elements of said samples.
- 20 53. A method of visualizing a sample in a wet environment according to any of claims 41 - 52 and wherein said scanning visualizes lipid containing entities in said sample.
- 25 54. A method of visualizing a sample in a wet environment according to any of claims 41 - 52 and wherein said scanning visualizes nucleic acid containing entities in said sample.

55. A method of visualizing a sample in a wet environment according to any of claims 41 - 52 and wherein said scanning visualizes protein containing entities in said sample.

5 56. A method of visualizing a sample in a wet environment according to any of claims 41 - 52 and wherein said scanning visualizes carbohydrate containing entities in said sample.

10 57. A method of visualizing a sample in a wet environment according to any of claims 41 - 52 and wherein said scanning visualizes metal containing entities in said sample.

15 58. A method of visualizing a sample in a wet environment according to any of claims 41 - 52 and wherein said scanning visualizes iodine containing entities in said sample.

59. A method of visualizing a sample in a wet environment according to any of claims 41 - 58 and wherein said sample is a biological sample.

20 60. A method of visualizing a sample in a wet environment according to claim 59 and wherein said biological sample comprises cells in a liquid.

25 61. A method of visualizing a sample in a wet environment according to claim 60 and wherein said sample comprises lipids within cells and said scanning visualizes said lipids.

62. A method of visualizing a sample in a wet environment according to any of claims 41 - 61 and wherein said scanning visualizes cells in said sample.

63. A method of visualizing a sample in a wet environment according to any of claims 41 - 61 and wherein said scanning visualizes tissue in tissue slices.

5 64. A method of visualizing a sample in a wet environment according to any of claims 41 - 51 and wherein said scanning visualizes tissue.

10 65. A method of visualizing a sample in a wet environment according to any of claims 41- 64 and wherein said scanning visualizes cells in said sample which are adherent to an electron beam permeable membrane.

15 66. A method of visualizing a sample in a wet environment according to any of claims 41 - 65 wherein said specimen enclosure comprises an electron beam permeable membrane and also comprising a step of growing cells on said electron beam permeable membrane prior to said scanning.

20 67. A method of visualizing a sample in a wet environment according to any of claims 41 - 66 wherein said specimen enclosure comprises an electron beam permeable membrane and also comprising a step of manipulating cells on said electron beam permeable membrane prior to said scanning.

68. A method of visualizing a sample in a wet environment according to any of claims 41 - 67 and wherein said scanning visualizes an outcome of introduction of an extrinsic molecule to said sample.

25 69. A method of visualizing a sample in a wet environment according to any of claims 41 - 68 and also comprising detecting electromagnetic radiation emitted from said sample as a result of said scanning.

70. A method of visualizing a sample in a wet environment according to claim 69 and also comprising analyzing said electromagnetic radiation.

5 71. A method of visualizing a sample in a wet environment according to claim 70 and wherein analyzing said electromagnetic radiation comprises spectral analysis.

10 72. A method of visualizing a sample in a wet environment according to any of claims 41 - 71 and also comprising detecting an electron beam backscattered from said sample as well as electromagnetic radiation emitted from said sample as a result of said scanning.

15 73. A method of visualizing a sample in a wet environment according to claim 72 and wherein said electromagnetic radiation comprises X-ray radiation.

20 74. A method of visualizing a sample in a wet environment according to either of claims 72 and 73 and wherein said electromagnetic radiation comprises visible radiation.

75. A method of visualizing a sample in a wet environment according to any of claims 72 - 74 and wherein said electromagnetic radiation comprises radiation having a wavelength within the range of 200 - 1000 nm.

25 76. A method of visualizing a sample in a wet environment according to any of claims 72 - 75 and wherein said electromagnetic radiation comprises radiation providing information relating to molecular structure of said sample.

77. A method of visualizing a sample in a wet environment according to any of claims 72 - 75 and wherein said electromagnetic radiation comprises radiation providing information relating to material distribution within said sample.

5 78. A method of visualizing at least one component in a multi-component sample in a wet environment comprising:

introducing a multi-component sample into a specimen enclosure in a wet environment; and

10 scanning said multi-component sample in said specimen enclosure in a scanning electron microscope, thereby visualizing at least one component of said multi-component sample.

15 79. A method of visualizing at least one component in a multi-component sample in a wet environment according to claim 78 and also comprising enhancing contrast between plural elements in said sample prior to scanning of said sample.

20 80. A method of visualizing a sample in a wet environment according to claim 79 and wherein said enhancing comprises specific labeling of at least some of said plural elements in said sample.

25 81. A method of visualizing a sample in a wet environment according to claim 79 and wherein said enhancing comprises specific labeling of molecules in said sample.

82. A method of visualizing a sample in a wet environment according to claim 79 and wherein said enhancing comprises specific labeling of receptors in said sample.

83. A method of visualizing a sample in a wet environment according to claim 79 and wherein said enhancing comprises specific labeling of organelles in said sample.
- 5 84. A method of visualizing a sample in a wet environment according to claim 79 and wherein said enhancing comprises specific labeling of binding sites in said sample.
- 10 85. A method of visualizing a sample in a wet environment according to claim 79 and wherein said enhancing comprises specific labeling of structural elements in said sample.
- 15 86. A method of visualizing a sample in a wet environment according to claim 79 and wherein said enhancing comprises specific labeling of functional elements in said sample.
- 20 87. A method of visualizing a sample in a wet environment according to any of claims 78 - 86 and wherein said scanning visualizes elements in said sample having contrast due to differences in atomic numbers of constituent atoms thereof.
88. A method of visualizing a sample in a wet environment according to claim 79 and wherein said enhancement introduces differences in atomic numbers of constituent atoms of elements of said samples.
- 25 89. A method of visualizing a sample in a wet environment according to any of claims 78 - 88 and wherein said scanning visualizes lipid containing entities in said sample.

90. A method of visualizing a sample in a wet environment according to any of claims 78 - 88 and wherein said scanning visualizes nucleic acid containing entities in said sample.

5 91. A method of visualizing a sample in a wet environment according to any of claims 78 - 88 and wherein said scanning visualizes protein containing entities in said sample.

10 92. A method of visualizing a sample in a wet environment according to any of claims 78 - 88 and wherein said scanning visualizes carbohydrate containing entities in said sample.

15 93. A method of visualizing a sample in a wet environment according to any of claims 78 - 88 and wherein said scanning visualizes metal containing entities in said sample.

94. A method of visualizing a sample in a wet environment according to any of claims 78 - 88 and wherein said scanning visualizes iodine containing entities in said sample.

20 95. A method of visualizing a sample in a wet environment according to any of claims 78 - 88 and wherein said sample is a biological sample.

25 96. A method of visualizing a sample in a wet environment according to claim 95 and wherein said biological sample comprises cells in a liquid.

97. A method of visualizing a sample in a wet environment according to claim 96 and wherein said sample comprises lipids within cells and said scanning visualizes said lipids.

5 98. A method of visualizing a sample in a wet environment according to any of claims 78 - 97 and wherein said scanning visualizes cells in said sample.

99. A method of visualizing a sample in a wet environment according to any of claims 78 - 97 and wherein said scanning visualizes tissue in tissue slices.

10 100. A method of visualizing a sample in a wet environment according to any of claims 78 - 97 and wherein said scanning visualizes tissue.

101. A method of visualizing a sample in a wet environment according to any 15 of claims 78 - 100 and wherein said scanning visualizes cells in said sample which are adherent to an electron beam permeable membrane.

102. A method of visualizing a sample in a wet environment according to any 20 of claims 78 - 101 wherein said specimen enclosure comprises an electron beam permeable membrane and also comprising a step of growing cells on said electron beam permeable membrane prior to said scanning.

103. A method of visualizing a sample in a wet environment according to any 25 of claims 78 - 102 wherein said specimen enclosure comprises an electron beam permeable membrane and also comprising a step of manipulating cells on said electron beam permeable membrane prior to said scanning.

104. A method of visualizing a sample in a wet environment according to any of claims 78 - 103 and wherein said scanning visualizes an outcome of introduction of an extrinsic molecule to said sample.

5 105. A method of visualizing a sample in a wet environment according to any of claims 78 - 104 and also comprising detecting electromagnetic radiation emitted from said sample as a result of said scanning.

106. A method of visualizing a sample in a wet environment according to
10 claim 105 and also comprising analyzing said electromagnetic radiation.

107. A method of visualizing a sample in a wet environment according to
claim 106 and wherein analyzing said electromagnetic radiation comprises spectral analysis.

15 108. A method of visualizing a sample in a wet environment according to any of claims 78 - 107 and also comprising detecting an electron beam backscattered from said sample as well as electromagnetic radiation emitted from said sample as a result of said scanning.

20 109. A method of visualizing a sample in a wet environment according to
claim 108 and wherein said electromagnetic radiation comprises X-ray radiation.

110. A method of visualizing a sample in a wet environment according to
25 either of claims 108 and 109 and wherein said electromagnetic radiation comprises visible radiation.

111. A method of visualizing a sample in a wet environment according to any of claims 108 - 110 and wherein said electromagnetic radiation comprises radiation having a wavelength within the range of 200 - 1000 nm.

5 112. A method of visualizing a sample in a wet environment according to any of claims 108 - 111 and wherein said electromagnetic radiation comprises radiation providing information relating to molecular structure of said sample.

10 113. A method of visualizing a sample in a wet environment according to any of claims 108 - 111 and wherein said electromagnetic radiation comprises radiation providing information relating to material distribution within said sample.

114. A method of visualization of a sample in a wet environment according to any of claims 78 - 113 and wherein said scanning comprises scanning said sample in said specimen enclosure in a scanning electron microscope at multiple different electron energy levels.

115. A method for visualization of a sample in a wet environment comprising:
obtaining a wet sample;
scanning said wet sample in a scanning electron microscope at a resolution which is not limited by the diffraction limit of light; and
detecting light emitted from said wet sample.

116. A method of visualizing a sample in a wet environment according to claim 115 and also comprising enhancing contrast between plural elements in said sample prior to scanning of said sample.

117. A method of visualizing a sample in a wet environment according to claim 116 and wherein said enhancing comprises specific labeling of at least some of said plural elements in said sample.
- 5 118. A method of visualizing a sample in a wet environment according to claim 116 and wherein said enhancing comprises specific labeling of molecules in said sample.
- 10 119. A method of visualizing a sample in a wet environment according to claim 116 and wherein said enhancing comprises specific labeling of receptors in said sample.
- 15 120. A method of visualizing a sample in a wet environment according to claim 116 and wherein said enhancing comprises specific labeling of organelles in said sample.
- 20 121. A method of visualizing a sample in a wet environment according to claim 116 and wherein said enhancing comprises specific labeling of binding sites in said sample.
122. A method of visualizing a sample in a wet environment according to claim 116 and wherein said enhancing comprises specific labeling of structural elements in said sample.
- 25 123. A method of visualizing a sample in a wet environment according to claim 116 and wherein said enhancing comprises specific labeling of functional elements in said sample.

124. A method of visualizing a sample in a wet environment according to any of claims 115 - 123 and wherein said scanning visualizes elements in said sample having contrast due to differences in atomic numbers of constituent atoms thereof.

5 125. A method of visualizing a sample in a wet environment according to claim 116 and wherein said enhancement introduces differences in atomic numbers of constituent atoms of elements of said samples.

10 126. A method of visualizing a sample in a wet environment according to any of claims 115 - 125 and wherein said scanning visualizes lipid containing entities in said sample.

15 127. A method of visualizing a sample in a wet environment according to any of claims 115 - 125 and wherein said scanning visualizes nucleic acid containing entities in said sample.

128. A method of visualizing a sample in a wet environment according to any of claims 115 - 125 and wherein said scanning visualizes protein containing entities in said sample.

20 129. A method of visualizing a sample in a wet environment according to any of claims 115 - 125 and wherein said scanning visualizes carbohydrate containing entities in said sample.

25 130. A method of visualizing a sample in a wet environment according to any of claims 115 - 125 and wherein said scanning visualizes metal containing entities in said sample.

131. A method of visualizing a sample in a wet environment according to any of claims 115 - 125 and wherein said scanning visualizes iodine containing entities in said sample.

5 132. A method of visualizing a sample in a wet environment according to any of claims 115 - 131 and wherein said sample is a biological sample.

133. A method of visualizing a sample in a wet environment according to claim 132 and wherein said biological sample comprises cells in a liquid.

10 134. A method of visualizing a sample in a wet environment according to claim 133 and wherein said sample comprises lipids within cells and said scanning visualizes said lipids.

15 135. A method of visualizing a sample in a wet environment according to any of claims 115 - 134 and wherein said scanning visualizes cells in said sample.

136. A method of visualizing a sample in a wet environment according to any of claims 115 - 134 and wherein said scanning visualizes tissue in tissue slices.

20 137. A method of visualizing a sample in a wet environment according to any of claims 115 - 134 and wherein said scanning visualizes tissue.

25 138. A method of visualizing a sample in a wet environment according to any of claims 115 - 137 and wherein said scanning visualizes cells in said sample which are adherent to an electron beam permeable membrane.

139. A method of visualizing a sample in a wet environment according to any of claims 115 - 138 wherein said specimen enclosure comprises an electron beam permeable membrane and also comprising a step of growing cells on said electron beam permeable membrane prior to said scanning.

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140. A method of visualizing a sample in a wet environment according to any of claims 115 - 139 wherein said specimen enclosure comprises an electron beam permeable membrane and also comprising a step of manipulating cells on said electron beam permeable membrane prior to said scanning.

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141. A method of visualizing a sample in a wet environment according to any of claims 115 - 140 and wherein said scanning visualizes an outcome of introduction of an extrinsic molecule to said sample.

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142. A method of visualizing a sample in a wet environment according to any of claims 115 - 141 and also comprising detecting electromagnetic radiation emitted from said sample as a result of said scanning.

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143. A method of visualizing a sample in a wet environment according to claim 142 and also comprising analyzing said electromagnetic radiation.

144. A method of visualizing a sample in a wet environment according to claim 143 and wherein analyzing said electromagnetic radiation comprises spectral analysis.

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145. A method of visualizing a sample in a wet environment according to any of claims 115 - 144 and also comprising detecting an electron beam backscattered from

said sample as well as electromagnetic radiation emitted from said sample as a result of said scanning.

146. A method of visualizing a sample in a wet environment according to
5 claim 145 and wherein said electromagnetic radiation comprises X-ray radiation.

147. A method of visualizing a sample in a wet environment according to either of claims 145 and 146 and wherein said electromagnetic radiation comprises visible radiation.

10 148. A method of visualizing a sample in a wet environment according to any of claims 145 - 147 and wherein said electromagnetic radiation comprises radiation having a wavelength within the range of 200 - 1000 nm.

15 149. A method of visualizing a sample in a wet environment according to any of claims 145 - 148 and wherein said electromagnetic radiation comprises radiation providing information relating to molecular structure of said sample.

20 150. A method of visualizing a sample in a wet environment according to any of claims 145 - 148 and wherein said electromagnetic radiation comprises radiation providing information relating to material distribution within said sample.

25 151. A method of visualization of a sample in a wet environment according to any of claims 115 - 150 and wherein said scanning comprises scanning said sample in said specimen enclosure in a scanning electron microscope at multiple different electron energy levels.

152. A method of visualization of a sample in a wet environment according to claim 151 and also comprising:

reconstructing a three-dimensional image of said sample by using multiple visualizations of said sample at said multiple different electron energy levels.

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153. A method of visualization of a sample in a wet environment according to any of claims 115 - 152 wherein said sample is a multi-component sample and said scanning comprises scanning said multi-component sample in said specimen enclosure in a scanning electron microscope, thereby visualizing at least one component of said 10 multi-component sample.

154. A method of visualization of a sample in a wet environment according to any of claims 115 - 153 and also comprising obtaining said sample to be inspected, said sample being in a wet environment.

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155. A method for manufacture of a biocompatible implant comprising:
forming a biocompatible implant of a biocompatible material;
inspecting at least a portion of the biocompatible implant in a scanning electron microscope in a wet environment;
analyzing results of said inspecting; and
20 classifying the inspected biocompatible implant in accordance with results of said analyzing.

156. A method for manufacture of a biocompatible implant according to claim 25 155 and wherein said inspecting comprises:
introducing a sample comprising at least said portion into a specimen enclosure in a wet environment; and

scanning said sample in said specimen enclosure in said scanning electron microscope, thereby visualizing said sample.

157. A method for detection, identification or characterization of
5 microbiological entities comprising:

obtaining a wet sample containing at least one microbiological entity;
scanning said wet sample in a scanning electron microscope while in an environment characterized by a pressure exceeding the vapor pressure of water; and
analyzing results of said scanning.

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158. A method for detection or identification of microbiological entities according to claim 157 and wherein said scanning comprises:

introducing said wet sample comprising said at least one microbiological entity into a specimen enclosure in a wet environment; and
scanning said wet sample in said specimen enclosure in said scanning electron microscope, thereby visualizing said wet sample.

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159. A method according to either of claims 157 and 158 and wherein said wet sample comprises urine.

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160. A method according to any of claims 157 - 159 and wherein said wet sample comprises feces.

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161. A method according to any of claims 157 - 160 and wherein said wet sample comprises blood.

162. A method according to any of claims 157 - 161 and wherein said wet sample comprises sputum.

163. A method according to any of claims 157 - 162 and wherein said wet sample comprises lavage of respiratory system.

5 164. A method according to any of claims 157 - 163 and wherein said wet sample comprises a tissue biopsy.

165. A method according to any of claims 157 - 164 and wherein said wet sample comprises an environmental sample.

10 166. A method according to any of claims 157 - 165 and wherein said wet sample comprises cerebro-spinal fluid.

15 167. A method according to any of claims 157 - 166 and wherein said wet sample comprises a soil sample.

168. A method according to any of claims 157 - 167 and wherein said wet sample comprises food.

20 169. A method according to any of claims 157 - 168 and wherein said wet sample comprises industrial products.

170. A method according to any of claims 157 - 169 and wherein said wet sample comprises a medical, industrial or household device.

25 171. A method for characterization of microbiological entities according to any of claims 157 – 170 and also comprising specific staining of said sample.

172. A method for characterization of microbiological entities according to any of claims 157 – 171 and also comprising treating said microbiological entity with chemicals.

5 173. A method for characterization of microbiological entities according to any of claims 157 – 172 and also comprising applying radiation to said microbiological entity.

10 174. A method according to any of claims 157 - 173 and wherein said analyzing comprises analyzing the morphology of said microbiological entity.

15 175. A method for characterization of biofilms comprising:
obtaining a wet sample of a biofilm;
scanning said wet sample of a biofilm in a scanning electron microscope;
and
analyzing results of said scanning.

176. A method for characterization of biofilms according to claim 175 and wherein said scanning comprises:
introducing said wet sample comprising said biofilm into a specimen enclosure in a wet environment; and
scanning said wet sample in said specimen enclosure in said scanning electron microscope, thereby visualizing said wet sample.

25 177. A method of visualizing a sample comprising:
obtaining a sample; and
scanning said sample in a wet environment in a scanning electron microscope while in an environment characterized by a pressure exceeding the vapor

pressure of water, without an intermediate solidifying, coating or slicing step thereby visualizing said sample.

178. A method of visualizing a sample comprising:

5 obtaining a sample; and

scanning said sample in a wet environment in a scanning electron microscope while in an environment characterized by a pressure exceeding the vapor pressure of water, without morphologically impacting preparation prior to scanning.

10 179. A method of visualizing a sample comprising:

obtaining a sample; and

scanning said sample in a wet environment in a scanning electron microscope while in an environment characterized by a pressure exceeding the vapor pressure of water, following at most fixing and staining before scanning.

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180. A method of visualizing a sample comprising:

obtaining a sample; and

scanning said sample in a wet environment in a scanning electron microscope while in an environment characterized by a pressure exceeding the vapor pressure of water, following at most treatment with at least one aqueous solution prior 20 to scanning.

181. A method of visualizing a sample comprising:

obtaining a sample; and

scanning said sample in a wet environment in a scanning electron microscope while in an environment characterized by a pressure exceeding the vapor pressure of water, without having been treated with a non-aqueous solution prior 25 to scanning.

182. A method of visualizing a sample comprising:
obtaining a sample of thickness exceeding 20 microns; and
scanning said sample in a scanning electron microscope while in an
environment characterized by a pressure exceeding the vapor pressure of water.
183. A method of inspecting adipose tissue comprising:
obtaining a sample of adipose tissue; and
scanning said sample of adipose tissue in a scanning electron microscope
while in an environment characterized by a pressure exceeding the vapor pressure of
water.
184. A method of inspecting adipose tissue according to claim 183 and
wherein said sample is not stained prior to said scanning.
185. A method of inspecting adipose tissue comprising:
obtaining a sample of adipose tissue; and
scanning said sample of adipose tissue in a scanning electron microscope
without said sample having been stained prior to said scanning.
186. A method for visualization of a sample comprising:
scanning said sample in a scanning electron microscope while in an
environment characterized by a pressure exceeding the vapor pressure of water, said
scanning taking place over an area of said sample which exceeds 25 square millimeters
without displacement of said sample relative to a stage of said scanning electron
microscope.
187. A method of inspecting an extracellular matrix comprising:

obtaining a sample of an extracellular matrix; and
scanning said sample of said extracellular matrix in a scanning electron microscope while in an environment characterized by a pressure exceeding the vapor pressure of water.

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188. A method of inspecting epithelial tissue comprising:
obtaining a sample of epithelial tissue; and
scanning said sample of said epithelial tissue in a scanning electron microscope while in an environment characterized by a pressure exceeding the vapor pressure of water.
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189. A method of inspecting kidney tissue comprising:
obtaining a sample of kidney tissue; and
scanning said sample of said kidney tissue in a scanning electron microscope while in an environment characterized by a pressure exceeding the vapor pressure of water.
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190. A method of inspecting a tissue biopsy comprising:
obtaining a sample of a tissue biopsy; and
scanning said sample of said tissue biopsy in a scanning electron microscope while in an environment characterized by a pressure exceeding the vapor pressure of water.
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191. A method of inspecting biological material comprising:
immunolabeling biological material; and
scanning said immunolabeled biological material in a scanning electron microscope while in an environment characterized by a pressure exceeding the vapor pressure of water.
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192. A method of inspecting tissue comprising:
immunolabeling tissue; and
scanning said immunolabeled tissue in a scanning electron microscope
5 while in an environment characterized by a pressure exceeding the vapor pressure of
water.
193. A method of inspecting a sample comprising:
scanning said sample in a scanning electron microscope while in an
10 environment characterized by a pressure exceeding the vapor pressure of water; and
inspecting said sample using light microscopy.
194. A method of analyzing toxic effects of exposure to a chemical or
combination of chemicals comprising:
15 subjecting an experimental animal to said exposure to said chemical or
combination of chemicals;
obtaining a sample from said experimental animal; and
scanning said sample from said experimental animal in a scanning
electron microscope while in an environment characterized by a pressure exceeding the
20 vapor pressure of water.
195. A method of analyzing toxic effects following exposure to environmental
conditions comprising:
identifying at least one individual that was exposed to said environmental
25 conditions;
obtaining at least one sample from at least one of said at least one
individual; and

scanning said at least one sample in a scanning electron microscope while in an environment characterized by a pressure exceeding the vapor pressure of water.

- 5 196. A method of characterizing chemical entities comprising:
 applying a chemical entity to cells in a SEM-compatible sample enclosure; and
 scanning said cells in a scanning electron microscope while in an environment characterized by a pressure exceeding the vapor pressure of water.
- 10 197. A method of characterizing chemical entities according to claim 196 and also comprising analyzing changes in cell shape.
- 15 198. A method of characterizing chemical entities according to any of claims 196 and 197 and also comprising analyzing the cytoskeleton of said cells.
199. A method of characterizing chemical entities according to any of claims 196 - 198 and also comprising analyzing the distribution of biomolecules in said cells.
- 20 200. A method according to any of the preceding claims and also comprising:
 detecting x-rays from a region of said sample; and
 analyzing said x-rays to detect the presence of at least one of iodine, metals and phosphorous in said sample.
- 25 201. A method according to claim 200 and also comprising determining the concentration of said at least one of iodine, metals, and phosphorus.

202. A method according to any of the preceding claims wherein said sample is impinged upon by electrons passing through an electron-permeable, fluid-impermeable membrane.

5 203. A method according to claim 202 and also comprising urging said sample against said electron-permeable, fluid-impermeable membrane.